

Re: Comments to Report on Technical and Operational Issues Impacting the Provision of Wireless Enhanced 911 Services

WT Docket No. 02-46

DA 02-2666

Introduction

Global Locate is responding to the FCC Request for Comments for the purpose of adding support to the points made in the October 15, 2002 report by Dale N. Hatfield ("Hatfield Report") and to present several recommendations for aiding the FCC in improving the nation's E911 readiness.

Global Locate is a privately held company that provides E911 and commercial positioning technology to wireless carriers and wireless equipment and semiconductor vendors around the world. Global Locate offers a unique Assisted GPS (AGPS) solutions that operate with GSM, iDEN as well as CDMA networks in addition to upcoming network standards, such as upcoming 2.5 EDGE and 3G UMTS, WCDMA and cdma2000. Presently Global Locate provides network server and reference network solutions that are operationally deployed by Nextel. Global Locate is currently in negotiation with other carriers globally for network and terminal products and services, and expects soon to begin fulfilling handset side solutions to provide a complete end-to-end technology.

E911 National Availability by 2005

Based on our interactions with stakeholders, we concur with the Hatfield report's overall conclusion that PSAP call management systems, LEC facilities readiness and adequate positioning technology accuracy are serious deployment concerns for completing the nation's E911 service by YE2005. As the Hatfield report summarizes, the country cannot afford to treat E911 as anything less than a national priority given the tragedy of September 11, added to its potential to save lives and lessen injury in more everyday circumstances across the country. Such a service turns directly on the capability of innovative solutions bringing nothing less than the most reliable and accurate positioning technology and instant pinpoint location management systems. We side with the view that there are many risks in deploying systems that 184M¹ US subscribers will depend upon by the close of 2005, when most of the nation's wireless carriers are expected to have completed their Phase II E911 installation. It's also worth noting that as many as 15-20M Americans may have wireless as their exclusive telephone service by that time. For these reasons, we believe that as 2002 closes, the nation's primary public safety and communication agencies must confront the fact that the E911 service faces a growing list of challenges that were outside previously unanticipated. Given the gravity of the Hatfield report findings, it seems fair to assume that the completion of the E911 system by YE 2005 is now in jeopardy.

We hold the view that the FCC and the nation's wireless carriers have performed their roles faithfully in terms of serving the public interest while carriers have the task of simultaneously ensuring shareholder returns on invested capital in E911. As 2002 draws to a close we see many ways in which the Commission and the national and regional carriers can insure timely completion of E911 as envisioned by Congress. Since the deployment appears to have serious problems according to the Hatfield report, we take this opportunity to offer specific recommendations that deserve attention over the next three years.

¹ Projected number of wireless subscribers by year end 2005, source: Jupiter Research, 2001

Consider Alternative Enforcement Steps that Lessen Risk and Encourage Innovation

Certain carriers have had to ask for waivers due to slower than expected development or arising from problems related to current capabilities of the chosen positioning technology. Unfortunately, these untimely disclosures have created an environment of mistrust and embarrassment between carriers and regulators, apparently damaging confidence on both sides. From our observation, we believe both sides are working with the highest of intentions, but due to the nature of a choose-early-fix-later technology selection and deployment process, the process places the two actors into untenable positions if the original technology choice fails to perform as planned. As of the time of the Hatfield report, it is not clear that monolithic network based solutions will attain full compliance in time to reach total national coverage mandate of YE 2005. We cannot fault the parties and vendors for trying, but is it appropriate to bet only on one technology versus a test of others where the chosen technology has performance issues?

While on the surface there is the mandate of technology neutrality, we believe the actual process results in quite the opposite. The current process has a tendency to close off good technology options thus making it difficult to employ innovative solutions that will offer high performance solutions and that will be available during the remaining years of E911 deployment. It therefore follows that the carriers are either forced to live with their nominated technology choice and battle an uncertain technology sourcing and integration process, or admit under pain of penalty that their initially chosen solution fails to meet commercial and regulatory standards. In their attempt to discharge their responsibilities, the regulators try to hold carriers to the points of their promises regarding a specific technology's performance (versus scrutiny of the carriers' compliance in terms of equipment provisioning) which falls outside the carriers' control. Carriers, after all, deploy and do not make or design the purpose-build E911 positioning equipment.

Based on this situation we recommend that the present enforcement regime be re-examined and should include, as recommended as one of the Hatfield report's principle recommendations, the exercise of greater regulatory flexibility and presence. This would include as the report recommends encouraging industry-wide test standards along with industry accessible test beds. Overall we recommend that the FCC act in partnership with the industry to enable innovative solutions to address outstanding E911 issues as early in the process as possible.

Maintain Technology Neutrality While Encouraging Innovative Solutions

While remaining consistent with its technology neutral policy, the FCC can encourage or even direct (in lieu of levying fines for instance) carriers to try technology alternatives thus avoiding today's process that unintentionally ties both sides to a mutually assured failure by forcing each side to undertake irrational positions or ineffective solutions.

Therefore we recommend that the FCC to adopt solutions that provide a form of safe harbor to provide carriers a sensible way to seek technology "insurance" when it appears that the primary technology compliance path be in doubt. Since this will require time, the safe harbor process would encourage early disclosure and proper testing. Such testing would then commence, possibly involving the FCC's Office of Engineering and Technology to jointly observe and oversee alternative solution testing and performance partnering toward successful and timely E911 service. Taking more than one course lessens risk and encourages innovative positioning and interim PSAP information solutions that may have not been foreseen but are still worth adopting.

Draft Policy that Explicitly Includes Both New and Hybrid Positioning Solutions

New technology advances arise as a natural consequence of greater market need for precise location services where innovative companies direct talent, energy and financial resources to the task. Not taking advantage of this hinders adoption of innovative technology, which can move fast even if late starting. Continuous improvement in silicon-based solutions, fueled by Moore's Law and improved signal processing methods, allow innovators such as Global Locate to address the full breadth of radio access technologies and a variety of commercial migration scenarios. Therefore, we encourage the FCC to contemplate in its upcoming actions related to E911 to maintain flexibility to allow entry of innovative technologies even if they are unable to cover all subscribers with a single positioning technology. This has several benefits for stakeholders:

1. It adds regulatory certainty that expresses support for carriers to adopt a combination of technologies if that best fits. Giving explicit targets and policy with respect to positioning technology combinations helps meet the goals that all stakeholders seek.
2. It helps close certain predictable positioning technology "loopholes" such as the Hatfield report examines in the case of roaming international visitors (starting with 20+ million Canadians, a segment of which regularly visit and live within 100 miles of the US border and included in 30 million² foreign visitors annually) many of whom have terminals that are communication compatible but may not be emergency location compatible due to lack of global adoption of a standard set of technologies.
3. It encourages adoption of location solutions by other countries currently evaluating their own national E911-like wireless services which would help secure both domestic and foreign citizens with a common technology as they travel.
4. It gives PSAP community an incentive to embrace an end-to-end fulfillment program knowing that they will get the best solution at the beginning and over time.
5. It empowers consumers who can match their needs to different capabilities offered between positioning solutions that meet their particular geographic coverage needs in urgent or emergency call situations. In this regard, it seems that policy should anticipate making consumers aware of the differences in E911 service coverage among options, and allowing them to decide on the solution that best fits their needs. (E.g., explain the different qualities of location services, so consumers may select a solution that corresponds to their travel pattern, or other non-emergency needs such as tracking elderly or children family members, and as raised previously, the concept of serving international incoming roamers.) This encourages service providers to offer the best and most competitive safety reliable service rather than only offer marginally accurate solutions.
6. Regulators can confidently account to legislative interests seeking a conclusive solution on behalf of the public.
7. Carriers are free to design intelligent solutions that meet E911 requirements while migrating their network technologies to maintain their commercial competitiveness.

Some may argue that it costs more to deploy hybrid, multi-technology solutions. However the cost of only one type of positioning technology can increase substantially if it is used throughout the network. Also, a mistake is often made about relative and true costs. Cingular³ and others have made the point that an "install it and you're done" assumption is unrealistic. Lifetime cost of certain positioning systems continues to mount as network topology and technology change to meet competitive and customer service demands. In the case of network solutions, maintenance cost to optimize the ranging electronics as network changes occur is necessary to maintain certifiable accuracy performance. When this is taken into account, handset based solutions can decrease the cost to fulfill in areas where network and geographic

² Source: The U.S. Immigration and Naturalization Service, 2000 regarding the number of legal visitors to the US.

³ LBS Summit, Oct 7-8, Atlanta, Andrew Clegg, Sr. Technical Member, Cingular in a presentation regarding the lifetime and maintenance costs of network technologies.

factors weigh against network solutions. Therefore, we argue that hybrid (AGPS added to legacy network based) solutions can for many deployment situations both reduce costs (installation and maintenance capital) and lessen risks associated with uncertain compatibility and future migration.

Encourage Policy that Ensures PSAP's and Consumers a Consistent E911 Service

An estimated 20% of E911 calls occur in the most difficult terrestrial network positioning situations: rural and highway locations. While these represent a minority of 911 calls for most metro, regional or national carriers, to an ex-urban PSAP, these calls represent a much larger percentage of their calls. Already forced to respond with limited resources compared to their metro counterparts, it should not necessarily follow that ex-urban accuracy and response time should degrade. While it's understandable that fewer calls might relate to having fewer deployable resources, forcing these PSAPs to also accept imprecise rural and highway accuracy possibly produced by satisfying compliance using statistical averaging outside their jurisdictions appears contrary to the spirit of the law and the public's interest for universally high service standards as independent of geographic factors as possible.

With advances in positioning technology such as GSM Enabled AGPS, E911 location accuracy need not be a function of the cell tower range or topology. In reply to the Hatfield report we therefore advocate that if new measurement standards are put forth, the compliance standards for accuracy should be adjusted to meet 50m (handset) or 100m (network) accuracy be applicable for individual PSAP service areas, not just determined by the broad regional or metro wireless service area that "average out" the needs of emergency services in rural/highway areas.

Moving toward Rational Compliance

The present course of action by carriers deploying non-AGPS systems has raised serious concerns by carriers, regulators, vendors, and the public safety community. Unlike the experiences of GPS enabled positioning solutions, carriers attempting network-based solutions in next generation networks have experienced great difficulty in attaining necessary accuracy and ubiquity. The Hatfield report further informs that differences in method of measurement arising from an interpreted guideline, OET 71. This undercuts the certainty of today's measurement results in ways that carriers and local government public safety agencies would rather not hear given their significant investments in E911.

Network based systems indeed show promise. TDOA promises a solution that enables tracking of legacy handsets that require no modifications to handsets and support a degree of positioning service needs. EOTD promises a way to range with existing terrestrial base station signals in theory using only the existing carrier signals to range, and requiring no hardware modification to handsets – only additional software in the handset. To account for timing differences among neighboring base stations, carriers must undertake a long and capital-intensive LMU deployment. These systems can work but their general accuracy and availability are impacted by the achieving a minimum number of surrounding "hearable" stations (which is also a function of the design of some next generation networks), a proper amount of resolution based on the neighboring cell geometry with respect to the terminal seeking its location (i.e., cell signals follow radially diverse paths to or from the mobile to avoid ambiguity in calculating terminal position), and physical terrain features that affect ranging estimation due to signal multipath. When the conditions of any of these variables change, in some cases by changing to next generation base station technology, the availability or reliability of network-based fixes predictably deteriorates.

Many of these conditions are by their nature dynamic, and in many cases are clearly beyond control of the service operators. Enough experts in and outside carrier organizations either cast doubt or conclude that network solutions will not meet the array of E911 ubiquity and accuracy demands and stay within financially affordable limits. As of the timing of this comment period, two national carriers have completely changed their choice of positioning technology direction due to apparent inadequacies only

found after their own large scale field tests revealed significant variance to earlier tests that apparently fell short of matching the conditions a generally deployable solution requires.

We recommend that the Commission seriously seek resolution to positioning technology issues raised in the Hatfield report while maintaining a technology neutral, but simultaneously maintain a rational all-inclusive stance toward innovative technologies such as GSM Enabled AGPS. Holding those carriers implementing network solutions for E911 to meet performance and date-certain based on a single technology solution may force carriers and all public safety stakeholders into a high risk outcome that serves no interest well.

Next Generation AGPS

Global Locate brings more precise, more accurate location response solutions consistent with established high performance capabilities of GPS. In addition to overcoming the traditional limitations of conventional GPS in wireless portable devices, Global Locate's AGPS solution is relatively innovative allowing GSM, EDGE and UMTS carriers to join CDMA carriers in realizing the advantages of rapid and high availability AGPS. AGPS is an accepted and established positioning technology. It is initially available for CDMA networks, which operate with GPS satellite reception to continuously, synchronize the terrestrial networks' signals. This reduces the time to fix and inherently increases the sensitivity of AGPS in those networks. Nextel, Verizon and Sprint have successfully deployed AGPS for E911 in terms of positioning accuracy and handset deployment milestones. Global Locate can similarly provide time-free solution offering virtually the same positioning technology advantages to carriers with non-GPS synchronized networks.

To achieve the full extent of accuracy and timeliness to mandated deadlines, we believe that the carrier and public safety community must look at all alternatives to maximize safety and satisfy carrier investment returns on investment. Global Locate's innovative but relatively new solution (under the current deadlines for E911 deployment) could not practically fulfill the entire carrier requirement, 95% of subscribers provisioned by YE 2005. However, GSM and other carriers employing a Global Locate solution could reach their mandate compliance levels more securely with AGPS as either additive or as the vanguard of their positioning solution arsenal.

The Role of Innovative GSM Capable AGPS

AGPS technology takes advantage of a dedicated network of precise ranging satellites which features ready, uniform service over the entire landmass of the US. While conventional GPS offers near ubiquity outdoors, the wireless subscriber takes a different course than those employing GPS in its traditional form. Global Locate applies the benefits of the wireless network to provide virtually instant receiver aiding which increases sensitivity and decreases response time. By adding advanced signal processing an overall 1000 times sensitivity improvement over traditional outdoor GPS receivers, next generation AGPS makes it possible to augment coverage adding a capability in locations, including indoor and urban canyon areas, that are simply unreachable using traditional GPS receivers. Finally, innovative use of time and frequency characteristics in satellite signals enables Global Locate's solution to operate in previously unusable non-synchronous networks such as GSM. Traditional GPS employ tracking which increases energy consumption significantly. Fast "trackless" reception used in Global Locate's platform sharply reduces power consumption making it favorable for portable devices such as cellular phones.

Summary Results using GSM Capable AGPS in E911

Global Locate recently presented the results of comprehensive tests based on independent 3rd party E911 service assurance firm's selected locations in a process that follows the OET 71 guidelines. We offer a complete presentation of the data and measuring environment at the company's web site, www.globallocate.com.

	Aggregate Results	OET 71 requirement
Total Number of test points <small>(1/3 urban and indoor, 1/3 suburban, 1/3 rural highway)</small>	399	
Median TTFF	0.5seconds	within 30 s
67% Accuracy @ 30 seconds	12m	50m
95% Accuracy @ 30 seconds	43m	150m